CLAIMS

WE CLAIM:

1. A network device for transmitting both data signals and power supply current over a transmission line, the network device comprising:

a power input; and

a coupling circuit that couples a data signal between the network device and the transmission line, the coupling circuit comprising:

at least one inductor for coupling power supply current from the power input to the transmission line.

2. The network device of claim 1, wherein the at least one inductor comprises a center-tapped inductor.

3. The network device of claim 1, wherein the coupling circuit further comprises at least one isolation transformer for coupling data between the transmission line and the network device;

wherein the at least one isolation transformer includes a data input side and a transmission line side; and

wherein the coupling circuit includes at least one capacitor connected in series with the transmission line side of the at least one isolation transformer.

4. The network device of claim 3, wherein the transmission line side of the at least one isolation transformer includes partial windings and the at least one capacitor is connected between the partial windings.

5. The network device of claim 2, wherein the coupling circuit further comprises at least one series inductor, the at least one series inductor being connected between the power input and a center of the at least one center-tapped inductor.

6. A network device for transmitting both data signals and power supply current over a transmission line, the network device comprising:

a power input; and

a coupling circuit that couples a data signal between the network device and the transmission line, the coupling circuit also provides power supply current from the power input to the transmission line, the coupling circuit comprising:

two isolation transformers for coupling data between the network device and the transmission line; and

two center-tapped inductors for coupling power supply current to the transmission line;

wherein the two isolation transformers each have a data input side and a transmission line side.

7. The network device of claim 6, wherein the coupling circuit further comprises two capacitors, each capacitor being connected in series with the transmission line side of a different one of the two isolation transformers.

8. The network device of claim 7, wherein each of the two capacitors is connected between partial windings on the transmission line side of a different one of the two isolation transformers.

9. The network device of claim 6, wherein the coupling circuit further comprises two series inductors, each series inductor being connected between the power input and a center of a different one of the two center-tapped inductors.

10. The network device of claim 6, wherein each center-tapped inductor is connected across the transmission line side of a different one of the two isolation transformers.

11. A coupling circuit for coupling a data signal and power supply current to a transmission line for use in a system for providing electrical power supply current to at least one network device, the coupling circuit comprising:

a data input and a power input, wherein the coupling circuit couples power supply current from the power input and couples the data signal from the data input to the transmission line;

at least one center-tapped inductor for coupling the power supply current to the transmission line; and

at least one isolation transformer for coupling the data input to the transmission line;

wherein the at least one isolation transformer includes a data input side and a transmission line side; and

wherein the coupling circuit includes at least one capacitor connected in series with the transmission line side of the at least one isolation transformer.